

WHAT IS CLAIMED IS:

1. A diffusion furnace for use in fabricating semiconductor devices, the furnace comprising:

5 a support member;

a process chamber installed on the support member;

a sealing member for sealing the process chamber from the outside, the sealing member being inserted between the support member and the process chamber; and

a cooling system for cooling the sealing member, the cooling system including

10 a first fluid passage in which a first fluid flows for cooling the sealing member, the first fluid passage being formed within the support member, and a second fluid passage in which a second fluid flows for cooling the sealing member when supplying the first fluid is interrupted, the second fluid passage being formed within the support member.

15 2. The diffusion furnace of claim 1, wherein the cooling system includes:

a first supply conduit connected to a first inflow port formed at one end of the first fluid passage;

a return conduit connected to a first outflow port formed at the other end of the first fluid passage;

20 a temperature controller, to which the first supply conduit and the return conduit are connected, for controlling the temperature of the first fluid supplied to the first supply conduit;

a second supply conduit connected to a second inflow port formed at one end of the second fluid passage; and

25 an exhaust conduit connected to a second outflow port formed at the other end of the second fluid passage.

3. The diffusion furnace of claim 1, wherein the sealing member is an O-ring.

30 4. The diffusion furnace of claim 1, wherein the first and second fluid passages are substantially ring-shaped.

5. The diffusion furnace of claim 4, wherein the second fluid passage is formed substantially coplanar with the first fluid passage.

6. The diffusion furnace of claim 4, wherein the first fluid passage and the second fluid passage are disposed one over the other.

7. The diffusion furnace of claim 1, wherein the first fluid has a higher boiling point than the second fluid.

8. The diffusion furnace of claim 1, wherein the second fluid is cooling water.

9. The diffusion furnace of claim 1, wherein the first fluid is an organic liquid.

10. The diffusion furnace of claim 1, wherein the first fluid is ethylene glycol.

11. A method for cooling a diffusion furnace, the method comprising:  
providing said diffusion furnace which includes a process chamber located on a support chamber;  
supplying a first fluid at a temperature controlled by a temperature controller to a first fluid passage formed in the support member;  
shutting off a first supply pipe connected to the first fluid passage when an error occurs at the temperature controller; and  
opening a second fluid passage connected to a second fluid passage disposed in the flange to supply a second fluid to the second fluid passage.

12. The method of claim 11, further comprising exhausting the second fluid from the second fluid passage to the outside.

13. The method of claim 11, wherein the second fluid is cooling water.

14. The method of claim 11, wherein the first fluid is glycol.

15. The method of claim 11, wherein the first and second fluid passages are substantially ring-shaped.

16. The method of claim 11, wherein the second fluid passage is formed substantially coplanar with the first fluid passage.

17. The method of claim 11, wherein the first fluid passage and the second fluid passage are disposed one over the other.

18. A method for cooling a diffusion furnace for fabricating semiconductor devices, the method comprising:

providing said diffusion furnace which includes a process chamber located on a support member;

supplying a first fluid at a temperature within a predetermined temperature range to a first fluid passage formed within said support member for cooling said support member during fabrication of said semiconductor devices;

shutting off the supply of the first fluid when the temperature of the first fluid is outside the predetermined temperature range; and

supplying a second fluid to a second fluid passage within the support member for cooling the support member to a temperature within the predetermined temperature range.

19. The method of claim 18, which further includes providing a sealing member, and sealing said process chamber from the outside with said sealing member.

20. The method of claim 18, wherein the sealing member comprises an O-ring.

21. The method of claim 18, which further comprises exhausting the second fluid from the second fluid passage to the outside.

22. The method of claim 18, wherein the second fluid passage is formed substantially coplanar with the first fluid passage.

23. The method of claim 18, wherein the first fluid passage and the second fluid passage are disposed one over the other.